Unlocking Latent Potential: The Success of Latino Students in the Project Bright IDEA Gifted and Talented Education Model

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Acronyms

AIG – Academically or Intellectually Gifted
ANOVA – Analysis of variance
EC – Exceptional Child
ESL – English as a Second Language
FRPL – Free/Reduced Price Lunch Eligible
GIB – Gifted Intelligent Behavior
GT – Gifted and Talented
HOM – Habits of Mind
IDEA – Interest Development Early Abilities
NAEP – National Assessment of Educational Progress
NRC/GT – National Research Center on the Gifted and Talented
PD – Professional Development

Abstract

Project Bright IDEA II, a gifted and talented (GT) education model implemented in several North Carolina elementary schools between 2004 and 2009, aimed to increase minority group GT representation through teacher training and implementation of a gifted curriculum for all participating kindergarten through second grade students. This study examines the effects of Bright IDEA for Latino students. Bright IDEA's structure may benefit Latinos more than other racial and ethnic groups by increasing teacher expectations and incorporating culturally-relevant materials. The program may benefit Latinos learning English as a second language (ESL) in particular by developing critical thinking skills, rather than focusing solely on English language development.

Through statistical analysis of program results, this paper finds only weak evidence that Bright IDEA has different effects on improving skills for Latino students as compared to other racial/ethnic groups. There is stronger evidence that ESL Latinos show greater improvement as compared to non-ESL Latinos. The main predictors of improvement among all Latino students were school-level characteristics, suggesting variation in program implementation between schools.

1 Introduction

According to the North Carolina General Assembly's definition of giftedness found in Article 9B § 115C-150.5, "Outstanding abilities are present in students from all cultural groups, across all economic strata, and in all areas of human behavior" (North Carolina Department of Public Instruction, 2001, p. 1). And yet, the demographic makeup of most gifted and talented (GT) programs does not accurately reflect the racial and ethnic diversity present in the American school-aged population. In North Carolina in particular, reports have found that minority populations are represented at about half the rate they should be considering their proportional representation in the general population (North Carolina Department of Public Instruction, 2001).

A recent influx of Latino immigrants to North Carolina has added to the discussion over minority representation in educational programming. Currently, Latino students face some of the lowest academic achievement results and highest dropout rates in the nation (Hemphill & Vanneman, 2011; U.S. Department of Commerce, 2013). These poor statistics are caused by a variety of factors, from language barriers for recent immigrants, to cultural dissonance between home and school life, to school-level characteristics such as poor facilities, resources, and teacher quality. (Castellano, 2002; Suárez-Orozco & Suárez-Orozco, 2003; Reardon & Galindo, 2009). They also experience a lack of representation in GT programming, which denies many Latinos the opportunity to engage with a deeper gifted curriculum.

Project Bright IDEA (Interest Development Early Abilities) is a revolutionary model of GT education that may cater to the unique needs of the Latino population. Bright IDEA was developed in response to the pattern of GT underrepresentation in North Carolina. By altering teacher dispositions to recognize and foster a diverse array of gifted behaviors, Bright IDEA aims to teach all kindergarten through second students in pilot classrooms using a gifted curriculum, thereby preparing a larger group of students for formal identification as Academically or Intellectually Gifted (AIG) in the third grade. It does so by focusing not only on individual state standards, but also by emphasizing the construction of critical thinking skills and learning habits that will assist students in solving a variety of higher-level thinking problems in the future. In other words, students are taught the process of learning, rather than the yes-or-no answers asked for on most tests. Success for these students is not just measured through test scores; rather, Bright IDEA looks for improvements in certain "gifted intelligent behaviors" (GIBs) that will help guide student achievement in the long-term, such as metacognition and academic flexibility (M. Gayle, personal communication, 5 February 2014). To summarize, Bright IDEA's theory of action is built around three core ideas. First, every child has talent; second, intelligence can be nurtured; and, third, teachers must nurture this intelligence. This teacher-focused approach to giftedness, according to outside program evaluator Dr. Ron Tzur of the University of Colorado, "raises the performance of gifted and regular children and has led to the extraordinary results achieved by Bright IDEA" (Hargett & Gayle, 2008, p. 30).

These theoretical approaches to studying Bright IDEA suggest that the program holds great promise for its students. This study is interested in the results of Bright IDEA specifically for the Latino population, especially given its swift growth in North Carolina over the past

few decades (North Carolina Institute of Medicine, 2003). In order to discuss how Bright IDEA caters to the Latino student population in North Carolina, two key questions must be answered. First, how do Latino students excel compared to other ethnic groups under Project Bright IDEA? And, second, does the ESL status of some Latino students affect which Latinos experience the most success? This research aims to answer these questions by delving into the specific Bright IDEA populations at hand, using least-squares regression analysis to see which Latino students are achieving the most. If a program like Bright IDEA can help underserved Latino students make dramatic gains in their gifted intelligent behaviors as compared to other groups, policymakers should be paying attention.

2 Literature Review

1. Project Bright IDEA: Habit formation as gifted and talented pedagogy

Project Bright IDEA offers a potential case study for exploring the most effective practices to improve minority underrepresentation in gifted programs. Bright IDEA, developed in response to the underrepresentation of minority students in North Carolina GT programming, studied a total sample of about 8,400 students in kindergarten through second grade (4,200 each in control and Bright IDEA classrooms) (Project Bright IDEA 2). In Bright IDEA classrooms, all students were taught using a gifted curriculum, a strategy that Briggs et al. (2008) define as front-loading, or "the process of preparing students for advanced content and creative and critical thinking prior to the formal identification process or before advanced-level courses are offered" (p. 137). In North Carolina, students are formally identified as "gifted" (AIG) in the third grade. Bright IDEA's model is predicated on the idea that, by teaching a gifted curriculum to all Bright IDEA K-2 students, more students in general will be prepared for formal AIG identification. Because of its apparent successes in reaching this goal, the program was expanded from 6 initial control and 6 treatment classrooms (Bright IDEA I) to include 28 schools between 2004 and 2009 (Bright IDEA II). It has also been adapted into some middle and high school programs, and it has now extended into other states (Project Bright IDEA 2; M. Gayle, personal communication, 5 February 2014).

Bright IDEA is unique compared to more traditional GT programs in its emphasis on viewing giftedness as more than just test scores. A variety of theories posit that gifted pedagogies must emphasize the development of higher-order thinking skills and learning habits, rather than merely teaching advanced material in the same style as traditional classrooms. Costa (2008) outlines 16 Habits of Mind that he considers useful for long-term academic success. These Habits of Mind [HOM] are "patterns of intellectual behaviors that [lead] to productive actions" (p. 16); they place emphasis on the process of learning information, rather than on the information learned. According to Costa, curricula should foster development of these patterns, which include persistence, metacognition, flexibility, a desire to continue learning, and curiosity, among others. From this, students learn not only the factual information the state requires them to know; they are also prepared to independently approach unknown information in the future. A 1995 National Research Center on the Gifted and Talented (NRC/GT) report has also developed a list of core attributes that students must develop to achieve academic success, including imagination, problem-solving skills, inquisitiveness, and communication skills. Certain existing

programs have found preliminary successes in academic achievement following a stringent focus on habit formation: for example, a focused emphasis on metacognitive tools has been shown to improve mathematics understanding, increase awareness of alternative problem-solving skills, and improve capacity to check one's own answers in students who were underperforming in math (Cardelle-Elawar, 1992). Bright IDEA's model incorporates both Costa's HOM theories (2008) and the NRC/GT core Talents, Attributes, and Behaviors (1995) in its teacher training and curriculum.

In order to best implement this habits-focused curriculum, Bright IDEA investigators conducted Professional Development (PD) training programs for participating teachers. PD emphasized high expectations for each student, with a particular emphasis on positive dispositions towards minority students. In addition, the training modules connected state standards to more rigorous GIBs and key thinking skills based on HOM theories. After receiving this two-week summer training, teachers implemented a gifted curriculum in *all* participating Bright IDEA treatment K-2 classrooms (Project Bright IDEA 2), with three main goals:

(1) Increase identification of underrepresented groups in gifted programming through teacher disposition and curriculum development training,

(2) increase enrollment of third grade students from underrepresented populations in gifted programming, and

(3) increase metacognitive and cognitive skills in all Bright IDEA students.

Initial results suggest that Bright IDEA has been successful in reaching all three of these goals. All Bright IDEA students—not only those in minority groups—were more likely to be identified as gifted in third grade: 24 percent of Bright IDEA students in Cohort 1 (2004-2007), 46 percent of those in Cohort 2 (2005-2008), and 15 percent of those in Cohort 3 (2006-2009) were placed into gifted programming by third grade, as compared to just 10 percent of non-Bright IDEA students. More specific to the program's goals, minority students were successfully identified as AIG proportionate to their population size (Watson, 2010).

Initial results of the program have also found a generally positive outcome in GIB gains following the implementation of its HOM-focused curriculum, meeting Bright IDEA's goals of increasing metacognitive and cognitive skills in all students. This result is particularly relevant for this study, which aims to delve into the specific GIBs developed across groups of Bright IDEA students. Interestingly, researchers have found that Bright IDEA's emphasis on forming key learning habits has translated into academic achievement in curriculum requirements as well, such as vocabulary improvement and other academic areas (Hargett & Gayle, 2008).

In addition, initial analyses of Bright IDEA II results have given the impression to some Bright IDEA researchers that Latino students have excelled rapidly in comparison to other racial and ethnic groups (M. Gayle, personal communication, February 5, 2014). At the time I received this information, no formal in-depth analyses had compared Latino

improvement under Bright IDEA to other groups. If this impression proved true, however, it could hold significant policy implications for future GT programs, especially given the growing Latino student population in the U.S. (Hemphill & Vanneman, 2011).

2. Changing demographics, changing needs: Latinos in the U.S. education system

The growth of the Latino population is no longer evident just in the states closest to the Mexican-American border; American demographics as a whole have changed dramatically over the past few decades due to the influx of Latino immigrants. In 1971, the Latino student population was so small that the National Assessment of Educational Progress (NAEP) included Latinos within the racial/ethnic group "other," which accounted for just two percent of the public school population (Hemphill & Vannerman, 2011). 43 years later, Latinos now make up 16.9 percent of the national population and, as of 2009, 21 percent of all public school fourth graders (U.S. Department of Commerce, 2014; Hemphill & Vanneman, 2011). Certain states have had especially high Latino immigration rates for decades, such as California, New Mexico, and Texas. For others, the recent influx of Latino immigrants is a new occurrence. In North Carolina, for example, the Latino population increased by 394 percent between 1990 and 2000, and Latinos now represent 8.7 percent of the population (North Carolina Institute of Medicine, 2003; U.S. Department of Commerce, 2014). This growth poses fresh challenges to the North Carolina education system as it adjusts to new demographic, cultural, and linguistic needs.

Data suggest that U.S. public schools have not yet adjusted to Latino immigration, a failure that may hold drastic academic consequences for the population. Latino students have displayed consistently lower scores on standardized reading and math tests than white students, an achievement gap that persists despite overall improvements on test scores for both groups since 1992 (Hemphill & Vanneman, 2011). This achievement gap may be a key factor in other academic consequences, including grade retention and school dropout (Valencia, 2002; Rumberger & Rodriguez, 2002). As of 2012, the high school graduation rate for Latinos was just 73 percent, as compared to 86 percent of white students (Layton, 2014). The results of academic frustration are also apparent in low Latino college goals and disproportionately low college attendance rates (Valencia, 2002). While 60 percent of Americans aged 18 to 25 plan to attain at least a bachelor's degree, only 48 percent of Latinos in this age group say the same (Lopez, 2009). With a Latino youth population expected to expand 78 percent between 2000 and 2025, these high dropout rates and meager college goals can have severe economic and social consequences (U.S. Department of Commerce, 1997, as cited in Rumberger & Rodriguez, 2002).

The Latino achievement gap persists for a variety of reasons. Some of the most prominent associated factors cited in the literature include school quality, English language skills, and socioeconomic status (Reardon & Galindo, 2009). Other factors include the level of rigor in coursework, teaching style, parent expectations, parent involvement in the education process, tracking systems, and lack of Latino cultural representation in curriculum materials (Madrid, 2011; Valencia, 2002). One illuminating example of language's impact on academic achievement is found in a Pew Hispanic Center survey, which found that, of those Latino students who drop out of high school and/or choose not to pursue a degree in higher education, about half do so because of poor English skills (Lopez, 2009). Even more

alarming, only 59 percent of English language learners nationwide graduate from high school (Layton, 2014).

Cultural misperceptions may also contribute to the lower achievement of Latino students (Valencia, 2002). Approximately 83 percent of public school teachers in the United States are Caucasian, often creating a cultural and ethnic gap between teachers and their diverse classrooms (U.S. Department of Education, 2012; Valencia, 2002). Because individuals' cultural biases affect their definitions of intelligence, many these teachers perceive giftedness from a white, middle-class paradigm, frequently identifying gifted behaviors in individuals who share these characteristics. Teachers associate giftedness with a strong English vocabulary, support from two English-speaking parents, a variety of books in the home, and high social intelligence, while they are less likely to expect giftedness when the student has many obstacles in the home, uses a limited Standard English vocabulary, or is struggling in one or more academic subjects (Moon & Brighton, 2008). Some studies suggest that teacher expectations have a direct effect on student achievement over time (Rosenthal & Jacobson, 1968; Weinstein et al., 1987). These expectations often stem from stereotypical heuristics such as ethnicity or socioeconomic status. Research has shown that teachers tend to have lower expectations of African-American students than of European-American students, even if the only distinguishing factor between the two students is their ethnicity (Elhoweris et al., 2005). Teachers also tend to have lower expectations for English language learners (Harris et al., 2009). The effect of expectations appears to be especially strong at young ages, particularly from kindergarten through second grade, suggesting that early intervention may have the most significant impact in raising teacher expectations and, therefore, student outcomes (Weinstein et al., 1987). The importance of early intervention is especially relevant for Project Bright IDEA, which targets kindergarten through second grade teachers.

3. The needs of the Latino gifted: Nurturing giftedness within a limited vocabulary

One additional factor in academic underperformance of Latino students occurs at the higher end of the learning spectrum, when schools fail to provide gifted Latinos with gifted services. A 2001 report by the North Carolina Department of Public Instruction found that minority groups are identified for GT programs at about half their proportional rate in the population, despite the logical assumption that giftedness is present at the same rate in all racial and ethnic groups. Using 2006 data from the National Center for Education Statistics and 2007 data from the U.S. Census American Community Survey, Esquierdo & Arreguín-Anderson (2012) note that, while Latino students make up about 20 percent of all kindergarten through 12th grade students in the nation, only 12.8 percent of national GT students are Latino. In North Carolina, the difference is even more striking: while Hispanic students make up 6.4 percent of public school enrollment, just 2.6 percent of these Hispanic students are enrolled in GT programs (The Leadership Conference on Civil and Human Rights, 2014). This underrepresentation is significant, especially given that being academically or intellectually gifted (AIG) is considered a special need in North Carolina. State law requires that schools identify AIG students and provide them with the services they need (NC General Statutes, Article 9B, §115C-150.7). If schools are not adequately complying (as the statistics suggest), AIG students are not receiving their legal right to an appropriate education.

One key Latino demographic most lacking in access to GT programs is the population of ESL (English as a Second Language) students. Latinos are of course not the only ones facing the issue of English language development; however, because about 80 percent of ESL students in the United States are Latino, the ESL issue is a significant factor in Latino GT underrepresentation (U.S. Department of Education, 2007). ESL students face a unique barrier, as most GT programs are monolingual in English (Suárez-Orozco & Suárez-Orozco, 2003). The system of English-only instruction creates an inherent power structure in which a student's native language is devalued in comparison to the dominant language, a realization that can damage self-esteem (Auerbach, 1993). While it is not feasible for all GT programs to include native language instruction, GT programs can show linguistic sensitivity in curricular planning to better meet the needs of ESL students.

One potential cause of Latino and ESL underrepresentation in GT programs is the use of flawed gifted identification measures (Passow & Frasier, 1996). While the federal definition of giftedness theoretically refers to a variety of characteristics, from intelligence to leadership skills to creativity, most identification methods rely purely on IQ and other test score cutoffs (Esquierdo & Arreguín-Anderson, 2012). This standardized testing and an exclusive focus on academic achievement tends to create a culturally insensitive and linguistically closed identification process (Castellano, 2002). However, in North Carolina, state AIG program standards require that all school districts use identification measures that are inclusive of underrepresented populations, including minority cultural and ethnic groups and English language learners (Public Schools of North Carolina, 2012). This factor is not addressed in the current study, but if North Carolina districts follow state standards for inclusive identification measures, flawed identification may not be the main factor contributing to minority underrepresentation in the state.

An alternative explanation for Latino and ESL underrepresentation in GT programs has to do with the teacher expectations described above. Studies find that programs that are most successful in increasing cultural and linguistic diversity in GT programs share a handful of key commonalities: in particular, the importance of teacher disposition training. In a national analysis of 25 GT programs, administrators increased cultural, linguistic, and ethnic diversity through the following key characteristics: administrative recognition of a dearth of diverse representation; staff training in perceptions of giftedness; continuing professional development for teachers; and family and community involvement (Briggs, Reis, & Sullivan, 2008).

The second step in this process, teacher training, appears to be one of the most important factors not only in the identification of ESL students as gifted, but in their overall educational experience. To teach most effectively, teachers must understand the unique needs of those learning in their non-native language and culture (Esquierdo & Arreguín-Anderson, 2012). In reading comprehension, for example, ESL students are better able to comprehend texts that include aspects of their home culture (Carrell, 1987). More broadly, gifted education of ESL students should ensure that students are not merely practicing English through grammar drills and rote memorization, but are actively participating in the construction of knowledge through group work, problem-solving activities, and the use of a variety of learning styles (Robisheaux, 2002). Through targeted teacher training, teachers

may create a GT curriculum that celebrates diversity and supports language development, all while including added emotional and social support for ESL learners (North Carolina Department of Public Instruction, 2001; Granada, 2003).

The Euclid Avenue Gifted/High Ability Magnet Program in Los Angeles, California, offers one example of a GT program that has utilized teacher training to create "success" for Latino ESLs. Success here is defined as program involvement and retention and the development of language abilities: Euclid Avenue's program retains 100 percent of its elementary school students, sends 75 percent of participants to middle school GT programs, and helps the majority of its ESL learners become at least proficient in English. It utilizes a dual language model of instruction, such that its students (98 percent of whom are Latino) learn in both Spanish and English. Training encourages teachers to emphasize creativity and critical thinking skills as they teach lessons based on broad themes, allowing students to make connections between subjects and look at the bigger picture. Lessons incorporate a variety of learning styles, and emphasize deep and complex discussion. These factors—a focus on critical thinking, linguistic variety, depth and complexity—allow Euclid Avenue to build its students' unique skills as bilingual individuals, and the results of this are evident in its successes (Briggs et al., 2008).

But it is not only teacher training in *curriculum* that could make a difference for ESL students—teacher training in cultural and linguistic *awareness* may also prove important. At present, teachers may fail to recognize ESL students' unique gifted behaviors. Gifted Latino bilingual students may exhibit high motivation, metalinguistic awareness, swift acculturation, heightened cultural awareness, self-control, and high levels of creativity, due to the skills they have developed by navigating between languages and cultures (Esquierdo & Arreguín-Anderson, 2012; Granada, 2003). Rather than viewing ESL status as a potential asset, however, teachers tend to view a limited English vocabulary as exactly that: a limitation to be overcome. Therefore, many teachers will prioritize basic language mastery before including students in GT programming, even if that child clearly exhibits gifted behaviors (Harris et al., 2009; Robisheaux, 2002). If teachers prioritize English mastery over all else, they will not foster these ESL students' unique gifts. If teacher misperceptions are truly the cause for Latino GT underrepresentation and underperformance in traditional classrooms, teacher training in curriculum and cultural and linguistic awareness—like that in Bright IDEA—may help alleviate this issue.

4. Remaining questions and the hopes of Project Bright IDEA

Previous research has not sufficiently addressed how GT programs can reach Latino students. In particular, prior research fails to fully examine the specific structural features of GT programs and policies on groups of Latino students. This leaves policymakers with limited evidence of how policies can best serve the needs of one of the fastest-growing populations in America.

The results from Project Bright IDEA may contribute key information to this topic. Previous analysis of Bright IDEA data has focused mainly on large-group analysis of academic achievement results, formal GT identification in third grade, and changes in teacher disposition following participation in the program. The only analysis available of changes in

GIB scores looks at changes in mean GIBs by race and ethnicity, without controlling for other confounding variables. Analyzing program results using multiple regression models to study the effects of characteristics like ESL and race/ethnicity on GIB changes may provide a more detailed picture of program results. In this way, Bright IDEA II data can offer a more complete explanation of whether Latino students are achieving in Bright IDEA classrooms relative to other groups, and, if so, why. Data may prove useful in answering two questions in particular:

(1) Do Latino students have different Gifted Intelligent Behavior (GIB) gains as compared to other racial and ethnic groups following participation in Bright IDEA?

(2) Do program results differ for Latino students learning English as a second language as compared to Latino native English speakers?

In general, one would make the assumption that Bright IDEA's emphasis on learning habits and higher-order thinking skills will lead to overall greater academic achievement for those Latino students who might not have developed these skills otherwise. Looking more specifically at within-group comparisons of Latinos, one would expect that Bright IDEA offers a solution to some of the most struggling Latino students: those learning English as a second language. All ESL Bright IDEA students are included in the Bright IDEA curriculum such that they develop long-term, higher-order thinking skills, as opposed to developing more superficial English languages abilities. The following research delves into these topics to provide a fuller picture of Latino student achievement within Project Bright IDEA.

4 Hypotheses

(1) **Latino Improvement Hypothesis:** *Latino students experience greater gains in GIBs as a result of involvement in Bright IDEA, as compared to other racial and ethnic groups in the program.*

This hypothesis is based on Bright IDEA's structure. The Bright IDEA program is designed to alter teacher dispositions such that they have higher expectations for all students. In addition, Bright IDEA places a heavy emphasis on selecting lessons that are relevant to students' cultures, which may improve the educational experience of groups (like Latinos) that were not previously represented in classroom materials. These effects, along with Bright IDEA's curricular focus on gifted intelligent behavior gains, may be greater for Latino students than for other racial and ethnic groups. If this hypothesis is true, the data will demonstrate that Latino students experience higher GIB gains than do other racial and ethnic groups.

(2) **ESL GIB Hypothesis:** *Within the Latino ethnic group, ESL Latino students are making even greater GIB gains than their non-ESL Latino peers following involvement in Bright IDEA.*

In contrast to traditional ESL programs, which focus mainly on rote vocabulary and grammar drills, Bright IDEA fosters critical thinking skills and other key learning

habits for all students in conjunction with English language development.[1] It also utilizes a teacher training model that encourages teachers to have high expectations for all students, no matter what their minority status, and to incorporate multicultural materials in the classroom. The literature indicates that these teacher training and curriculum practices have had positive effects for ESL students in particular (Briggs et al., 2008), suggesting that ESL Latinos will benefit even more than non-ESL Latinos from Bright IDEA participation, as manifested in more improved GIB scores. If this hypothesis is correct, the data will demonstrate greater GIB gains for Latino ESL students in Bright IDEA than for non-ESL Latino Bright IDEA students.

5 Data

Project Bright IDEA was implemented in two stages: Bright IDEA I and Bright IDEA II. Bright IDEA I refers to the small pilot study of 6 control and 6 treatment programs from 2001-2004; Bright IDEA II refers to the program's expansion between 2004 and 2009 to 28 schools in 13 North Carolina counties. Data were collected during the 2004-2009 study on about 8,400 students, with about 4,200 each in control and treatment classrooms (Project Bright IDEA 2; AND M. Gayle, personal communication, 23 October 2014). This analysis will focus only on data for Bright IDEA treatment students in Project Bright IDEA II.

To be involved in Bright IDEA, researchers selected schools via a Request for Proposal that was disseminated to every school district. Schools were selected for the program based on school demographics, diversity, and further GT learning opportunities within the school. District leaders randomly selected two classes each in kindergarten, first, and second grades in each school as treatment classrooms, and two classes in each grade as control classrooms. Schools committed to assigning Bright IDEA students to Bright IDEA classrooms from kindergarten through second grade, allowing for program assessment over time. Teachers in treatment classes were told that they could not share information about Bright IDEA methods with teachers in control classes. Bright IDEA researchers have found evidence that some districts did not follow these instructions and allowed classrooms to volunteer for the control or treatment group. Researchers have not specified which of the schools and districts did so, and it certainly presents limitations to finding causal relationships (M. Gayle, personal communication, 23 October 2014).

Bright IDEA outcomes were measured in terms of academic achievement (through standardized K-2 math, reading, and writing assessments); measures of GIBs; changes in teacher disposition; and, for students entering the third grade, the number of students formally identified as gifted. Data were collected at both the beginning and end of each school year to study the effects of Bright IDEA over time. Data on teacher disposition were collected before and after PD training to see how the training affected teacher perceptions of giftedness and student potential (M. Gayle, personal communication, 5 February 2014).

[1] Note that ESL students in Bright IDEA still participate in periodic, non-Bright IDEA ESL pullout classes. The key here is that, during the times when ESL students are integrated in the full classroom, they continue to foster critical thinking skills.

Due to difficulties accessing some parts of the data, this dataset will utilize only 2,147 cases of the 4,200 students who participated in the program.[2]

For the quantitative analysis of my hypotheses, I use the data for Bright IDEA II treatment classrooms. The dataset was collected by Bright IDEA researchers in the 2004-2009 school years in grades K-2 in participating North Carolina school districts (13 districts total, each with 1 to 3 participating schools). For all analyses, I include all school years in which the data were collected to provide a more long-term understanding of student gains. In addition, by including all years, I have access to a larger sample of schools involved in Project Bright IDEA, as some joined later in the program's implementation. I exclude all students not involved in the Bright IDEA program, because my research questions involve comparisons between students *within* Bright IDEA. My analyses do not include the third grade identification data, teacher disposition data, nor academic achievement data, but focus solely on the effects of Bright IDEA II for GIB improvement.

To test both hypotheses, the key dependent variables are defined as changes in individual Gifted Intelligent Behavior scores between the beginning and end of each program year. These GIBs were largely developed in line with Costa's HOM theories (2008). All GIBs were teacher-reported on a 5-level scale (listed from lowest level of development to highest level of development): Readiness, Emergent, Progressing, Early Independent, and Independent. For purposes of this analysis, these measures were converted to quantitative levels in which readiness = 1, emergent = 2, and so on through independent = 5. All teachers received the same PD training in rubric use, designed to ensure standardization of measurement across classrooms. All mean GIB scores were mean-centered. The specific GIBs used in this analysis include the following:

> *Metacognition.* Metacognition refers to a student's ability to think about thinking. This allows a student to monitor personal learning processes and needs.
>
> *Questioning*. Questioning refers to the ability to ask questions and pose new problems. This GIB reflects student curiosity, inquisition, and ability to consider new problems that need to be addressed.
>
> *Persistence*. This GIB reflects academic persistence, which refers to the ability to learn independently and stay focused, even when faced with challenging material.
>
> *Creating*. Creating refers to a student's creativity, imagination, and innovation. This GIB helps students academically because it allows students to take risks and think of alternative solutions to problems.
>
> *Flexibility*. This GIB measures a student's ability to think flexibly in the classroom.

[2] It is important to note that different cohorts and different grade levels measured different GIBs. For example, only schools in Cohort 1 measured students' levels of academic flexibility between the beginning and end of the school year. Because of this difference, analysis of the various GIBs uses various sample sizes and compositions.

Academic flexibility is key in allowing students to approach problems using a variety of methods and to take multiple perspectives.

Empathy. This GIB refers to a student's ability to listen and understand with empathy. Empathy allows students to understand and experience the emotions and thoughts of another, including, for example, characters in a story.

Humor. This GIB measures a student's ability to find and appreciate humor. Costa (2008) believes that finding humor has a variety of positive effects for social and academic development, from psychological benefits such as higher-level thinking skills to the ability to recognize satire and irony in literature.

Risks. Risks refers to a student's skills in taking responsible academic risks. In the classroom, this might reflect a student's ability to tackle new tasks without knowing the outcome; a student is not daunted by uncertainty.

Applying Past Knowledge. This GIB is fairly self-explanatory: students are able to apply knowledge from past experience to new problems. Applying past knowledge is key in the classroom, as it allows students to build on previous material using the skills they have already developed.

Openness to Continuous Learning. This GIB is also self-explanatory. It reflects a student's willingness and desire to continue to learn, including inquisitiveness, efforts at improvement, and courage to seek new information.

The key independent variable for the Latino Improvement Hypothesis is *Race/Ethnicity*, a categorical variable dividing students into white, black, Latino, and other (including Asian, Native American, and other racial and ethnic groups with less than 5% representation in the sample).[3] The key independent variable for the ESL GIB Hypothesis is *ESL category*. The ESL category is a simple dichotomous measure that distinguishes between students who are learning English as a second language and those who are not.[4]

Regression analyses assessing both hypotheses will control for other variables associated with GIB growth (see Table 1 for summary statistics of each predictor variable). The percentage of students eligible for free/reduced price lunch (*FRPL*) in a county is a rough proxy for socioeconomic status within a participating county.[5] *Gender* is a binary, teacher-reported measure. *Exceptional Child (EC)* is a teacher-reported binary variable that reports whether a student has a special learning need (including physical and learning disabilities).[6] *Grade* is a categorical variable that demonstrates whether a student is in

[3] See codebook for assumptions made regarding race/ethnicity reporting.
[4] See codebook.
[5] FRPL for an individual school would be a preferable measure, but is not included here due to difficulties in data accessibility.
[6] AIG students are also considered EC under North Carolina definitions; however, all Bright IDEA students are K-2, meaning none have been formally identified as AIG. EC thus does not refer here to gifted students.

kindergarten, first, or second grade; this should act as an effective proxy for age, which may have a significant impact on the program's effectiveness. *County* includes the 10 counties from Bright IDEA available in this dataset. *School* includes 22 elementary schools included in this dataset. *Cohort* is separated into three categories: Cohort 1 (2004-2007), Cohort 2 (2005-2008), and Cohort 3 (2006-2009). Bright IDEA studies took place in different schools over these different 3-year periods. Based on sampling design, cohort, school, and county may covary systematically.

[INSERT TABLE 1 ABOUT HERE]

6 Methodology

Step 1: Descriptive Statistics

The data analysis first summarizes the available results of Project Bright IDEA. This summary includes means and standard deviations for all key GIBs and demographic information for students (gender, ESL, EC distribution, etc.). Analysis of variance (ANOVA) tests look for a difference in mean GIB improvement by subgroup, especially focusing on a possible difference between racial/ethnic groups.

Step 2: Testing the Latino Improvement Hypothesis

The Latino Improvement Hypothesis tests for a difference in change in mean GIB score by race/ethnicity, focusing specifically on whether Latino students experience significantly different results.

(1) *Descriptive Statistics*

(2) *Regression Model 1*: The general regression model will take the following form:

$$\mu_t - \mu_{t-1} = \alpha + \beta_1 \text{Latino} + \beta_2 \text{White} + \beta_3 \text{Black} + \beta_4 \text{Other} + \beta_5 \text{Grade} + \beta_6 \text{Gender} + \beta_7 \text{FRPL} + \beta_8 \text{School} + \beta_9 \text{EC} + \varepsilon$$

In this model, mean difference in GIB score is a function of race/ethnicity, grade level, gender, county FRPL levels, school, and EC category. The key independent variable here is the Latino category. If the coefficient for this variable is positive and significant, there is evidence to support the hypothesis, because it suggests that being Latino as compared to other non-Latino students is associated with greater improvement in GIB skills under Bright IDEA's curriculum. The regressions use a variety of GIBs as dependent variables, each of which were chosen depending on whether initial ANOVA tests found evidence of an association between the GIB and race/ethnicity.

Step 3: Testing the ESL GIB Hypothesis

To test this hypothesis, I compare the GIB gains for ESL Latinos with those for all other racial and ethnic groups, including non-ESL Latinos. The key independent variable is an

interaction term between ESL status and Latino, because this shows how being ESL *and* Latino, as opposed to just one or the other, influences GIB gains.

(1) *Descriptive Statistics*: I divide Latinos into ESL and non-ESL groups and summarize the GIB gains for all 5 groups (black, white, Latino ESL, Latino non-ESL, and other).

(2) *ANOVA Testing*: The ANOVA test looks for a statistically significant difference in changes in pre- and post-GIB measures between ESL Latinos and white, black, non-ESL Latino, and other groups. I repeat this process multiple times to view change in mean scores for each alternative GIB measure.

(3) *Regression Model 2*: The model takes the following general form:

$$\mu_t - \mu_{t-1} = \alpha + \beta_1 \text{Latino} + \beta_2 \text{White} + \beta_3 \text{Black} + \beta_4 \text{Other} + \beta_5 \text{ESL} + \beta_6 \text{Latino*ESL} + \beta_7 \text{Grade} + \beta_8 \text{Gender} + \beta_9 \text{FRPL} + \beta_{10} \text{School} + \beta_{11} \text{EC} + \varepsilon$$

This model is similar to the one above, except that it includes an interaction term between Latino ethnicity and ESL status. If this hypothesis is correct, the coefficient for this interaction term will be positive and significant, as this suggests that being ESL and Latino leads to higher GIB gains that being one or the other.

7 Background Analysis of the Data

Changes in mean GIB scores following participation in Bright IDEA suggest that Bright IDEA has achieved its basic goals: average improvement for Bright IDEA participants has been positive for all GIB measures (Figure 1)[7]. On average, participants in Bright IDEA improved at least one level in each GIB from the beginning to the end of the school year. The exceptions to this are for Creating and Persistence. Although both show positive improvement, on average, cases remained within the same GIB level in which they started by the end of the school year, improving by only 0.81 points.

[FIGURE 1 ABOUT HERE]

These initial GIB findings suggest only a weak relationship between racial/ethnic group and program results. The mean difference in GIB scores appears to stay fairly constant across groups, although there are some patterns available. Latino students do appear to have greater gains than other groups in Humor, Risks, and Flexibility, providing some evidence in support of the Latino Improvement Hypothesis (Figure 1). Caucasian students

[7] Although it would be preferable to compare these results to the control group to more accurately describe Bright IDEA improvement relative to non-Bright IDEA participants, teachers in the control group could not collect data on GIB scores because they never received training in GIBs or GIB rubrics.

exhibit greater improvement in Metacognition, Questioning, Creating, and Persistence, while the "other" category surpasses the Latino, white, and black groups in Applying Past Knowledge, Empathy, and Openness to Continuous Learning. Black students as a group exhibit lower rates of improvement than other groups. In general, though, these differences are only slight. Only in the Creating and Persistence categories is the greatest improvement about double the least improvement. For other GIBs, the difference in means is at most 0.53 points.

[TABLE 2 ABOUT HERE]

ANOVA tests of GIB improvement differences across all racial and ethnic groups find some evidence of an association between race/ethnicity and mean change in GIB scores, but not for all GIBs (Table 3). Questioning and Persistence show a statistically significant difference across racial and ethnic groups based on ethnicity at the 1 percent level (p-value = 0.008 and 0.006, respectively). Creating scores show evidence of differences at the 5 percent level (p-value = 0.031). Flexibility does not show strong evidence in support of the hypothesis, but its p-value of 0.081 does warrant further analysis to see whether there is an effect of race/ethnicity.

Ethnicity is not the only factor that may be related to changes in GIB scores. ANOVA tests suggest that a student's school, cohort, and rate of FRPL eligibility in the county all have a statistically significant effect on GIB improvement (Table 3). The strong difference in GIB scores between schools is especially disconcerting, as it suggests that the program's effects are dependent on teachers' and school administrators' practices and efforts in program implementation. Bright IDEA's teacher disposition and curriculum training should have prepared all teachers to implement the program in a similarly effective manner. These initial results, however, suggest that school-level autonomy in program implementation prevents such consistency, although other factors may play a role as well.

Interestingly, GIB improvement does not seem to vary based on a student's ESL category. Initial ANOVA testing for each GIB shows no evidence in support of the ESL GIB Hypothesis. The exception is the academic flexibility GIB. Changes in flexibility scores may differ based on ESL status (p-value = 0.044).

[TABLE 3 ABOUT HERE]

8 Results

Testing the Latino Improvement Hypothesis

Initial descriptive statistics show that Latino Bright IDEA participants on average exhibit greater gains than other racial/ethnic groups in only three of the GIBs analyzed: Humor, Risks, and Flexibility (Figure 1). However, ANOVA test results provide little to no evidence of differences in improvement by racial/ethnic group for any of these GIBs (Table 2). Initial ANOVA tests did find an apparent difference in improvement for Questioning, Persistence, Creating, and Flexibility by racial and ethnic group. Given these ANOVA results (Table 2),

the regression models used to test the Latino Improvement Hypothesis only use Questioning, Persistence, Creating, and Flexibility as the dependent variables, as there is no evidence that race/ethnicity plays a role in other GIBs.

Multiple regression models similarly fail to provide support for the Latino Improvement Hypothesis; in fact, for Persistence, regression models suggest a *negative* effect of Latino on GIB improvement (Table 4). According to these results, a Latino student will increase his or her level of Persistence by 0.41 points fewer than a white student, all else held constant (p-value = 0.016). This effect is not as strong when the ESL variable is included in the model, suggesting that there is multicollinearity between being ESL and being Latino (Model 2).

[TABLE 4 ABOUT HERE]

In contrast to the findings for Persistence, being Latino does not seem to have a statistically significant effect on improvement in Creating (p-value = 0.737; see Table 5). In fact, there is no evidence that race/ethnicity has an association with Creating. However, an interaction term between school and being Latino shows weak evidence that ethnicity may have an effect if the student attends Samson Elementary (p-value = 0.073). While this evidence is weak, it has important implications. 26 percent of Bright IDEA participants at Samson are Latino. Perhaps there is a positive effect on Latino improvement at schools with higher percentages of Latino students. Further research is required to make any conclusive statements on this subject.

[TABLE 5 ABOUT HERE]

Regression models for the third GIB of interest, Flexibility, similarly find weak evidence of a relationship between being Latino and increases in Flexibility scores. The initial model used here (Model 1, Table 6) finds some support at the $\alpha = 0.10$ level that being Latino is associated with an increase in Flexibility score of 0.33. When an ESL variable is included in the model, the model provides no evidence of an effect of being Latino on changes in Flexibility scores (p-value = 0.9898, Model 2). Further, Model 2 finds evidence of an interaction term between ESL and Latino such that being ESL and Latino in Bright IDEA is associated with an improvement in Flexibility that is 1.23 points greater than for non-ESL, non-Latino Bright IDEA participants (p-value = 0.03). The implications of this are further discussed in Chapter 10. No strong evidence was found for other potential interactions, such as the interaction between school and being Latino, school and ESL status, or FRPL and being Latino.

[TABLE 6 ABOUT HERE]

Differences in pre- and post-Bright IDEA Questioning scores do seem to have an association with being Latino (Table 7). According to regression models of change in Questioning scores, a Latino student will experience growth in Questioning that is 0.2 points less than the growth of a white student in Bright IDEA (p-value = 0.033). (Interestingly, there is even stronger evidence that black students will achieve less than white students, with a p-value less than 0.0001). When ESL is included as a control variable, the effects of being Latino are

no longer statistically significant, suggesting an existing correlation between these two variables.

[TABLE 7 ABOUT HERE]

Testing the ESL GIB Hypothesis

The results from tests of the Latino Improvement Hypothesis suggest that being Latino in and of itself may not be strongly associated with growth in GIBs. However, these regressions may suppress the effects of how being an ESL Latino student affects GIB growth. Previous studies on ESL students suggest that pedagogy should include a variety of learning styles that emphasize critical thinking, rather than focusing on rote English grammar drills (Robisheaux, 2002). Because of Bright IDEA's emphasis on GIBs rather than basic language abilities, ESL students should theoretically benefit from this unique gifted curriculum, perhaps even more than other groups.

[TABLE 8 ABOUT HERE]

In this dataset, 115 of the 219 Latino participants (52.5 percent) were listed as ESL by their teachers (Table 8). Initial evidence suggests that these ESL Latinos experienced different GIB improvement than non-ESL Latinos (Figure 2). According to the mean change in GIB score for Latinos by ESL status, it appears as though ESL Latinos experience greater improvement for Flexibility, Metacognition, Empathy, Openness to Continuous Learning, Applying Past Knowledge, and Risks. ANOVA results support these initial perceptions, finding evidence of a significant difference in mean score change between white, black, other, Latino non-ESL, and Latino ESL students for Flexibility at the 1 percent level, for Questioning, Persistence, and Applying Past Knowledge at the 5 percent level, and for Creating and Risks at the 10 percent level (Table 9).

[FIGURE 2 ABOUT HERE]

[TABLE 9 ABOUT HERE]

As in the Latino Improvement Hypothesis, regression models used only those GIBs that demonstrated evidence of a significant difference between ESL Latinos and non-ESL Latinos to test the ESL GIB Hypothesis. Note that the majority of these GIBs are not the GIBs for which models found a significant difference in mean improvement for being Latino, with two exceptions: Questioning initially showed evidence for an effect of being Latino, and Flexibility found a significant effect of an interaction between being Latino and being ESL.

As expected from the previous regression analysis (Table 6), the effect of being both Latino and ESL is seen most significantly for changes in Flexibility scores (Table 10). Model 1, which divides racial/ethnic group into black, white, other, Latino non-ESL, and Latino ESL, finds that Latino ESL students experience on average 0.77 points of improvement more than non-ESL Latinos under Bright IDEA (p-value = 0.03). Model 2, which is almost

identical to Model 1 for Academic Flexibility under the Latino Improvement Hypothesis, does not separate Latino as a racial/ethnic group into ESL and non-ESL. Rather, it incorporates an interaction term between Latino and ESL. Model 2 finds no evidence that racial/ethnic group has a significant effect on academic flexibility gains. However, it does find evidence in support of an interaction between Latino and ESL, such that a Latino student who is ESL will receive 1.23 points of improvement more than a non-ESL, non-Latino participant (p-value = 0.035).

[TABLE 10 ABOUT HERE]

Applying Past Knowledge regression models also suggest that being both Latino and ESL has a positive effect on overall GIB growth (Table 11). Model 1 finds that being a Latino ESL student is associated with GIB growth 1.47 points higher than that of a non-ESL Latino student (p-value = 0.001). Interestingly, this model suggests that all other racial/ethnic groups in the study experience greater growth than non-ESL Latinos, a finding that has implications for program implementation. Model 2, which looks at racial/ethnic group without dividing Latino by ESL status, finds no significant difference of being Latino on growth in Applying Past Knowledge (p-value = 0.24). There is also no evidence of an effect of ESL status alone on GIB growth. However, Model 2 does find evidence for an interaction between being ESL and Latino, such that a Latino ESL student receives on average 1.39 points of growth higher than a non-ESL non-Latino student (p-value = 0.046).

[TABLE 11 ABOUT HERE]

Regression models for Questioning and Persistence do not support the evidence found in ANOVA testing of a difference between Latino ESLs and other racial/ethnic groups (see Tables 12 & 13 in Appendix). According to Model 1 for Questioning (Table 12), the most significant predictors of GIB growth are county FRPL, school, EC status, and grade level. This model also finds that black students are likely to experience 0.3 points less in GIB growth than white students (p-value < 0.0001). However, being both ESL and Latino was statistically insignificant in both models, providing no evidence of a difference in GIB growth between ESL Latinos and non-ESL Latinos.

Other Major Findings

Although this study focuses on the Latino outcomes within Project Bright IDEA, other findings are too significant to ignore here. The most striking predictor of GIB improvement predicted in all models is a student's school. For example, for the Persistence GIB (Table 4), a student at Polk Elementary improves 0.42 points more than a student at Valley View Elementary (p-value = 0.028).[8] Students at Polk Elementary also receive 0.59 points more improvement on average in Creating compared to Valley View students (p-value = .004, Table 5). Models predict that a student at Valley View will experience growth in Flexibility

[8] Despite this effect of school on Persistence, tests found no evidence of an interaction between being Latino and which school a student attends (p-value = 0.584), suggesting that teacher disposition training has at least succeeded in keeping results for Latino students constant across schools for the Persistence GIB.

that is over 1 point greater than a student at Johnson Elementary (p-value = .0004, Table 6). Recalling that there are only 5 points possible on the GIB rubric, this result is clearly significant. In general, these coefficients for individual school are the largest in all models, making school an even more significant predictor than race, ethnicity, or ESL status. These results do not necessarily mean that students are improving more in some schools than in others (although this might be the case). It is important to note that the rubrics for concepts like "empathy" and "metacognition" are highly subjective, and it would not be surprising for some teachers to employ the rubric differently than others.

A further systemic factor in GIB improvement is the FRPL level in a school's county, although the specific effect FRPL level changes depending on the GIB. Models for Persistence find that a 1 percent increase in the proportion eligible for FRPL in the county is associated with a 0.07-point increase in Persistence (p-value = 0.002, Table 4). This positive association with GIB improvement is also seen in models for Creating (p-value = 0.04, Table 5). In contrast, a 1 percent increase in county FRPL level is associated with a 0.1-point *reduction* in GIB improvement for Questioning (p-value < 0.0001, Table 7). This difference may occur due to difference in school measurement of different GIBs. Because there are so few schools within each county (one to three), school measures could be highly correlated with county FRPL levels, affecting the perceived GIB results.

EC category is an individual characteristic that has a consistently negative significant effect on predicted GIB improvement. These results suggest that a student with a special need tends to see less improvement in GIBs compared to a non-special needs student. For Flexibility, for example, being an EC student is associated with growth 0.39 points less than growth for those in the non-EC category (p-value = .02, Table 6). Similar associations follow for Questioning: a child identified as EC is likely to receive 0.47 points of growth fewer than a non-EC student (p-value <0.0001, Table 7).

Finally, grade level is a significant predictor, but for only one GIB: Questioning. Being in kindergarten is associated with growth in Questioning that is 1.76 points less than growth in second grade (p-value < 0.0001, Table 7, Model 2); being in first grade, on the other hand, is associated with 1.15 points of growth more than in second grade (p-value = 0.005). This same model also provides support of an interaction between county FRPL levels and grade, suggesting that, in kindergarten, an increase in FRPL level is associated with improvement in Questioning 0.02 points greater than growth for a non-kindergarten student (p-value = 0.001). This has a variety of implications: perhaps FRPL has a greater effect as students grow older, or perhaps the skewed nature of the FRPL variable is affecting these results as well.[9]

9 Findings and Major Themes

[9] Although the models in this study find that grade level is significant only for Questioning, this may be due to the structure of the dataset itself. For the majority of GIBs, data were included for just one grade level, making it impossible to test for a difference in GIB improvement according to grade. Grade level was excluded from most regression analyses here due to this data problem.

1. Latino students do not *experience greater GIB improvement than other racial/ethnic groups.*

The Latino Improvement Hypothesis predicted that Latinos under Bright IDEA would demonstrate greater GIB improvement than other racial/ethnic groups. However, regression models for the GIBs analyzed did not find any evidence to support this hypothesis. In fact, for two of the four GIBs analyzed (Persistence and Questioning), models found statistical evidence that being Latino is associated with *less* GIB improvement than for white students within Bright IDEA.

For these same GIBs, models also predicted that black students improve less than white students. These findings should alarm Bright IDEA program operators. In an ideal world, Bright IDEA would find no gap between student improvement by race/ethnicity, but these findings suggest that Bright IDEA falls prey to the same achievement gap issues present throughout the American education system.

2. ESL Latinos may experience greater improvement than non-ESL Latinos.

Evidence from models using Applying Past Knowledge and Flexibility as the dependent GIBs suggests that being both ESL and Latino has a significant, positive effect on GIB improvement outcomes. In fact, for Applying Past Knowledge, evidence demonstrates that ESL Latinos are not the only ones who outperform non-ESL Latinos in terms of GIB improvement: black, white, and other racial and ethnic groups all experienced improvement that was significantly greater than that of the non-ESL Latino group.

And yet, it is not possible to extend these results to all GIBs. The other two GIBs analyzed here, Persistence and Questioning, demonstrated no effect of being either ESL or Latino on GIB outcomes. These mixed results have various implications. It is possible that certain parts of the curriculum favor ESL Latino learners over non-ESL Latinos, leading to significant differences between these groups in only certain GIBs. This is just one possible explanation, however. The key point is that this analysis cannot say with certainty that ESL Latinos achieve differently than non-ESL Latinos under Bright IDEA.

3. Individual schools experience drastically different changes in GIB scores.

All regression analyses discovered that one of the most significant predictors of change in GIB score was a student's school. Ideally, Bright IDEA would standardize its program such that all schools implemented it in the same manner, allowing for a more accurate study of program results across schools and counties. However, the realities of an elementary school classroom can interfere with this ideal goal. There are a variety of possible reasons for why individual schools experience such varied mean changes in GIB score.

First, it is possible that program implementation differs between schools. Teachers may choose to implement the curriculum fully in one school, and partially in another, depending on unique classroom needs, misunderstanding of program requirements, or other reasons. Support from school leaders may have an impact on a teacher's ability to implement Bright IDEA properly. Or, perhaps the Bright IDEA summer institute teacher training is ineffective

in preparing teachers and administrators to implement the program in a standardized manner. All of these factors are entirely probable in a classroom setting, and thus may all contribute to this difference between schools.

Second, teachers' misunderstanding of GIB rubrics may cause this school-level variability. GIBs are supposed to be standardized on a 5-point scale, but the categories along this scale are highly subjective: it can be difficult to objectively quantify a student's level of "empathy," for example. Even with standardized training in measuring GIB outcomes, teacher biases and misunderstandings my skew these results.

4. EC students do not experience the same achievement as students without special needs.

There is statistically significant evidence in most of the regression models displayed here that EC students improve less than all non-EC students in Bright IDEA classrooms. While not surprising, this finding does demonstrate that Bright IDEA has not been as effective in reaching special needs students. This is not one of the program's aims, but, if program leaders believe this issue deserves attention, they should aim to incorporate special needs training in PD sessions. Bright IDEA leaders may also consider creating a curriculum that is more focused towards special needs students, if they feel that current curricula are not adequately serving this population. Of course, further research on special needs students is needed before making any significant Bright IDEA policy changes.

10 Limitations

A variety of difficulties have placed limitations on the applicability of this Bright IDEA II dataset and analysis. For one, a large amount of data is missing in a systematic fashion. Some participating schools and classrooms are completely missing from the dataset. Considering the strong effects of individual school and teacher subjectivity in GIB measurements, this lack of a fully representative sample has probably skewed the results of this analysis. This is especially clear when all cases with missing or improperly coded gender are included as a separate gender category. The coefficient for this "missing gender" category is a statistically significant predictor for the Questioning GIB (Tables 7 & 12), suggesting that the missing gender information is somehow associated with GIB outcomes. These biases stemming from missing data prevent generalization of results to all of Project Bright IDEA; future analysis should incorporate all data collected to improve the applicability of the program analysis.

Inconsistencies in data reporting are also of concern. Teachers received detailed instructions on how to report data. However, teachers frequently developed their own unique styles of data reporting, particularly for the ESL and EC variables (see Codebook). This analysis had to make some major assumptions regarding what teachers meant by their coding decisions. However, given that these variables did not appear to create major differences in GIB improvement predictions, it does not seem that the inconsistencies vastly altered the results of this analysis.

Another potential issue is that these analyses may fall prey to multicollinearity problems between control variables. Regression model results show that both individual school and county FRPL eligibility rates are two of the strongest predictors of GIB growth, but there is clear correlation between these two variables: a school's socioeconomic demographics may reflect the average socioeconomic status of the surrounding county as well. Coefficients for these variables may therefore be inaccurate.

Finally, the measurement of the dependent GIB variables poses a potential problem. This analysis assumes that the dependent GIB variables can be quantified. Recall that these variables were originally measured on a 5-point rubric as "readiness," "emergent," "progressing," "early independent," and "independent." This analysis has quantified each of these levels as a score of 1, 2, 3, 4, and 5, respectively. This assumes that the differences between each score are standardized; that is, growth from a level 1 to level 2 is the same amount of growth as that from level 3 to level 4. It is possible that teachers did not apply these measurements in a standardized manner; for example, a jump from level 1 to level 2 may be far more significant than the difference between level 3 and level 4. If this is the case, my statistical analyses are inaccurate representations of the relationship between predictor variables and GIB outcomes.

To test whether this might change overall results, I collapsed two key GIBs of interest, Questioning and Applying Past Knowledge, into dichotomous indicators that showed whether a student had improved by one "level" or not. This student could have improved from readiness to emergent, or early independent to independent: the growth from one level to another was the key factor, not the levels themselves. Collapsing these variables into dichotomous, categorical variables allows for analysis that does not rely on shaky assumptions of equal differences between GIB levels.

After collapsing the variables, I reran the same regression models as log-odds regressions using these new indicators as dependent variables. Results from the new regression models find very different results from the models presented in this analysis (see Tables 14 & 15 in Appendix). While the original model for Questioning found a significant negative coefficient for being Latino, the new dependent variable does not show any association with race/ethnicity. Similarly, original linear regression models predicted a significant positive effect of being ESL and Latino on Applying Past Knowledge; models using the collapsed dichotomous GIB variable find no evidence of a relationship between ESL status and GIB improvement.

These results are illuminating. When the variables change such that the models only attempt to predict a 1-level change in GIB, rather than GIB improvement as a continuous measure, the results of this paper change dramatically such that ESL status and race/ethnicity no longer play a role in GIB improvement. These tests suggest that the statistical methods used in this paper are not entirely appropriate for analyzing the GIBs as dependent variables. Further exploration into GIB measurement and scaling would shed light on inconsistencies in the results.

11 Conclusion and Further Questions

Results from Bright IDEA II analyses are fairly mixed, preventing strong conclusions about the program's effects on Latino students. The data provide weak evidence at best of a difference in improvement for Latinos as compared to all other racial and ethnic groups. Even the strong evidence found in favor of greater ESL Latino improvement is not applicable across all GIB outcomes. Therefore, the findings from this study do not support my hypotheses.

Even so, the study does provide some key insight into the Latino experience in Bright IDEA. ESL Latinos experience greater improvement in Flexibility and Applying Past Knowledge than non-ESL Latinos and some other racial and ethnic groups. Existing theory might explain this result as the effect of bilingualism: code switching between the school and family environment equips bilingual students with higher levels of flexibility, as seen in their swift acculturation skills (Granada, 2003). Applying Past Knowledge improvement may be attributed to Bright IDEA's emphasis on culturally-relevant materials in the curriculum. If students are able to draw from the experiences they are familiar with and connect them to classroom materials, this can greatly enhance learning, just as Carrell (1987) finds that ESL reading comprehension improves when texts include aspects of a student's home culture. Although other GIBs did not find as strongly significant results as these two outcome measures, these results should not be ignored. These findings provide support for existing theories regarding ESL students' learning habits. They also remind Bright IDEA program coordinators that they must now work to incorporate ESL pedagogies into other GIBs.

This study also contributes to current discussions about programs like Bright IDEA that aim to increase gifted identification of minority students in general. The importance of school-level variables in predicting student growth is a key finding. As noted previously, the impact of individual school could be due to a lack of standardization in GIB measurement across schools, or it could mean that there is a difference in implementation strategies between schools (or a combination of the two). The question of unstandardized measurement is an important one, and Bright IDEA program designers should work to increase standardization of GIB rubric use to better analyze the program's impact across schools.

Varied implementation strategies, on the other hand, are a more subjective issue. While Bright IDEA designers might hope for uniformly positive results in all participating schools, outcome variation might be caused by innovation in schools. Just as states act as "laboratories of democracy" for national policy, individual schools may be implementing creative additions to Bright IDEA that could lead to better results. For example, Bright IDEA co-designer Margaret Gayle is already aware of one school that went above and beyond the commitment of other participating schools by sending buses to individually transport parents to Bright IDEA information sessions. According to Gayle, this school has seen far higher levels of parent involvement as a result, which could have an impact on overall student achievement in the program (personal communication, 5 February 2014). Strategies like this may create problems with confounding variables in data analysis, but,

data problems aside, they can provide Bright IDEA with practical and field-tested ideas for program improvement.

Ultimately, future research and analysis is required to fully comprehend the results of Bright IDEA II, and this study leaves a variety of questions behind that could be considered at a later date. First, it is important to note that the dataset analyzed here was incomplete in many ways. It included only a quarter of total participants in Bright IDEA II. It did not consider a variety of key confounding variables like student socioeconomic status or amount of time spent in the U.S., both of which should be controlled for in future analyses. It did not include measures of actual academic achievement (standardized test scores), which might provide a better understanding of Latino achievement in Bright IDEA. Future research should delve further into the connection between these gifted intelligent behaviors and results on standardized assessments. Is there a connection between GIBs and standard academic outcomes like math and reading scores? Answering this question would help assess the value of habit formation in general. If there is no connection between GIBs and test scores, perhaps our standardized assessments do not accurately reflect the critical thinking skills and gifted behaviors valued in Bright IDEA and other gifted programs.

In conclusion, even with its limited results, this study provides some key insights into the past success of Project Bright IDEA, and the direction that future research and program implementation should take. As Bright IDEA expands into other grade levels and schools across the country, an effective plan for program evaluation is key in order to accurately study the benefits of this inspirational GT model. Findings from this study suggest that there is something about Bright IDEA that creates immensely positive benefits for its students. While the difference in improvement for ESL Latino students as compared to other groups may seem negligible because it is only apparent for two GIBs, Bright IDEA has helped these typically underserved students experience greater improvement in two key learning habits that they can use as lifelong academic tools. Bright IDEA has great potential for fostering long-term giftedness. Program evaluations should be able to more effectively reflect this promise through accurate and complete data.

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Appendices

Table 1. List of predictor variables included in analysis, along with summary statistics.

Predictor Variable	Mean/Proportion	Standard Deviation
Race/ethnicity		
Caucasian	43.1%	
Black	32.2%	
Latino	10.2%	
Other	8.0%	
ESL	7.1%	
Exceptional Child (EC)	9.5%	
Female	44.6%	
Cohort membership		
Cohort 1	66.1%	
Cohort 2	13.7%	
Cohort 3	20.2%	
School or county		
Bakers County	8.3%	
Ellis County	4.4%	
Greenfield County	9.7%	
Helmsworth County	11.9%	
Longfellow County	24.7%	
Morgan County	10.6%	
Red Rock County	11.6%	
Rhodes County	6.4%	
Ryder County	40.5%	
Willow County	8.4%	
Adams Elementary	5.4%	
Ash Creek Elementary	5.2%	
Angelou Elementary	0.3%	
Brown Elementary	5.4%	
Booker T. Washington Elementary	3.9%	
Carter Elementary	10.2%	
Hadley Elementary	2.2%	
Hilton Elementary	2.1%	
James Madison Elementary	4.4%	

Johnson Elementary	5.5%	
Langley Elementary	2.5%	
Love Elementary	5.9%	
Montgomery Elementary	6.2%	
Norton Elementary	8.4%	
Ordway Elementary	1.9%	
Pierce Elementary	1.5%	
Polk Elementary	6.0%	
Roosevelt Elementary	4.8%	
Samson Elementary	4.5%	
Stanton Elementary	2.0%	
Van Buren Elementary	5.2%	
Valley View Elementary	6.7%	
County FRPL	63.1%	0.12
Grade		
Kindergarten	23.9%	
First Grade	27.5%	
Second Grade	46.9%	

- Note: All county and school names have been changed to protect the privacy of teachers and administrators involved in Bright IDEA.

Figure 1. Mean change in GIB score by racial/ethnic group. Latinos appear to outperform other racial/ethnic groups in Humor, Risks, and Flexibility.

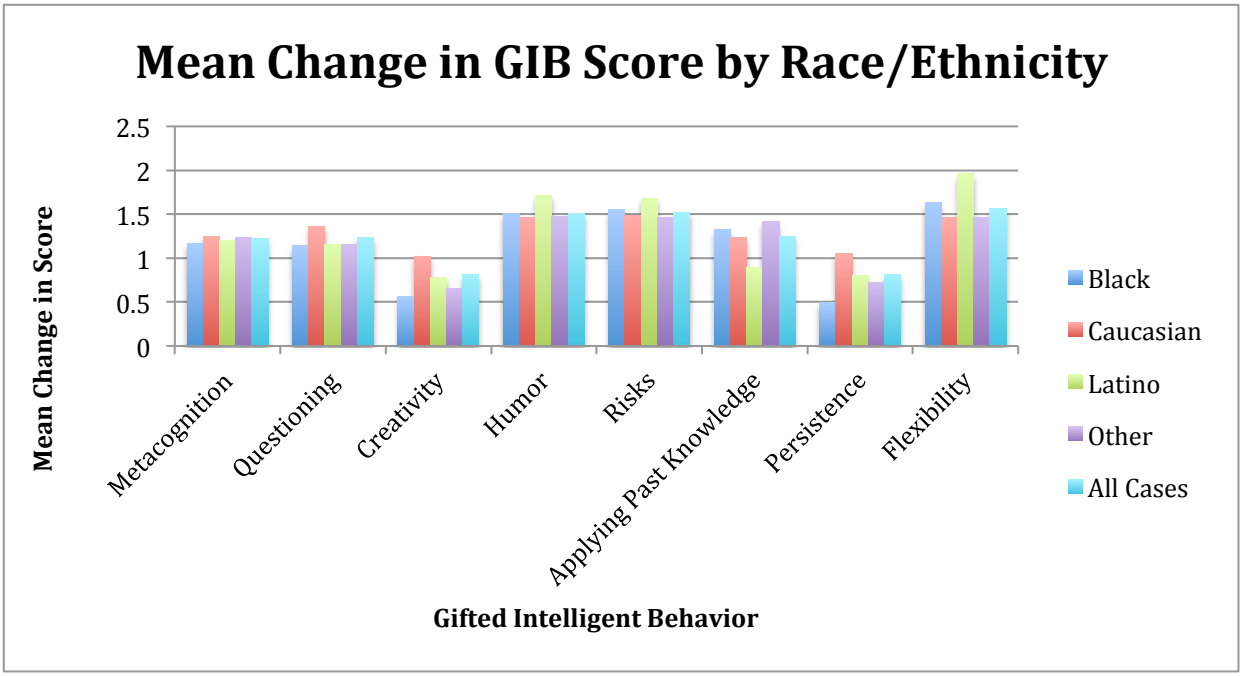

Table 2. ANOVA results for mean change in GIB score based on race/ethnicity.

	Race/Ethnicity		
GIB	F Statistic	P-Value	Significance
Metacognition	0.48	0.698	
Questioning	3.93	0.0084	**
Persistence	4.247	0.0059	**
Open to Continuous Learning	0.62	0.602	
Listening with Empathy and Understanding	0.197	0.898	
Creating	3	0.031	*
Flexibility	2.26	0.081	.
Risks	0.395	0.757	
Humor	0.523	0.666	
Applying Past Knowledge	1.15	0.329	

- $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3. ANOVA results for mean change in GIB score based on various predictor variables.

	F-statistic			
GIB	**School**	**ESL**	**Cohort**	**FRPL**
Metacognition	11 ***	0.167	18.3 ***	9.807 **
Questioning	12.59 ***	1.429	25.61 ***	1.84
Persistence	27.79 ***	0.015	1.097	8.512 **
Open to Continuous Learning	10.16 ***	0.019	12.69 ***	8.371 **
Listening with Empathy and Understanding	13.44 ***	0.085	20.62 ***	19.76 ***
Creating	25.21 ***	1.479	0.073	11.15 ***
Flexibility	9.987 ***	3.153 *	12.95 ***	7.576 **
Risks	7.264 ***	1.801	3.552	5.932 *
Humor	11.72 ***	0.776	4.357 *	1.122
Applying Past Knowledge	15.67 ***	0.008	17.53 ***	20.14 ***

Table 4. Multiple regression models of change in Persistence as a function of ethnicity and other control variables.

GIB: Persistence	**Model 1**			**Model 2**		
	Estimate	p-value	Significance	Estimate	p-value	Significance
Intercept	-3.65 (1.51)	0.0162	*	-3.65 (1.51)	0.0163	*
Free/Reduced Price Lunch	0.07 (0.02)	0.002	**	0.08 (0.02)	0.002	**
Carter	-1.44 (0.23)	<0.0001	***	-1.44 (0.23)	<0.0001	***
James Madison	-0.45 (0.25)	0.0814	.	-0.45 (0.25)	0.078	
Johnson	-0.99 (0.22)	<0.0001	***	-0.99 (0.22)	<0.0001	***
Love	-0.90 (0.50)	0.0738	.	-0.89 (0.51)	0.0779	
Montgomery	-0.78 (0.27)	0.0034	**	-0.77 (0.27)	0.0044	**
Polk	0.42 (0.20)	0.0275	*	0.43 (0.20)	0.0315	*
Roosevelt	-2.85 (0.64)	<0.0001	***	-2.87 (0.65)	<0.0001	***
Samson	-2.17 (0.45)	<0.0001	***	-2.12 (0.45)	<0.0001	***
Valley View						
Latino	-0.41 (0.17)	0.0163	*	-0.29 (0.21)	0.1678	
Black	-0.36 (0.12)	0.0044	**	-0.35 (0.12)	0.0056	**
Other	-0.18 (0.19)	0.3342		-0.13 (0.19)	0.4965	
White						
Female	0.02 (0.10)	0.8652		0.02 (0.10)	0.847	
EC	-0.44 (0.17)	0.0089	**	-0.43 (0.17)	0.0101	*
ESL				-0.19 (0.22)	0.3835	
Adjusted R^2		0.494			0.493	

Table 5. Multiple regression models of change in Creating as a function of race/ethnicity and other predictor variables.

GIB: Creating	**Model 1**			**Model 2**		
	Estimate (SE)	p-value	Significance	Estimate (SE)	p-value	Significance
Intercept	-3.54 (1.54)	0.0222	*	-3.95 (1.58)	0.01319	*
FRPL	0.072 (0.02)	0.00376	**	0.08 (0.03)	0.00204	**
Carter	-1.34 (0.23)	<0.0001	***	-1.38 (0.24)	<0.0001	***
James Madison	-0.33 (0.26)	0.214		-0.35 (0.26)	0.184	
Johnson	-0.83 (0.22)	0.0002	***	-0.87 (0.24)	0.00034	***
Love	-0.74 (0.52)	0.152		-0.69 (0.52)	0.191	
Montgomery	-0.73 (0.27)	0.0083	**	-0.7 (0.28)	0.01136	*
Polk	0.59 (0.2)	0.004	**	0.53 (0.22)	0.01602	*
Roosevelt	-2.59 (0.66)	0.0001	***	-2.82 (0.7)	<0.0001	***
Samson	-1.90 (0.46)	<0.0001	***	-2.27 (0.5)	<0.0001	***
Valley View						
Latino	-0.07 (0.22)	0.737		-0.55 (0.47)	0.2471	
Black	-0.26 (0.13)	0.044	*	-0.25 (0.13)	0.0572	
Other	-0.14 (0.2)	0.468		-0.1 (0.2)	0.604	
White						
Female	-0.099 (0.11)	0.347		-0.13 (0.11)	0.225	
EC	-0.37 (0.17)	0.027	*	-0.36 (0.17)	0.0343	*
ESL	-0.5 (0.22)	0.023	*	-0.56 (0.24)	0.019	*
Latino*Johnson				-0.11 (0.68)	0.877	
Latino*Love				0.81 (0.61)	0.182	
Latino*Montgomery				0.06 (0.97)	0.95	
Latino*Polk				0.64 (0.56)	0.257	
Latino*Roosevelt				-0.054 (0.68)	0.936	
Latino*Samson				1.00 (0.56)	0.073	.
Latino*Valley View						
Adjusted R^2	0.466			0.468		

Table 6. Multiple regression models of change in Flexibility as a function of race/ethnicity and other control variables.

GIB: Flexibility	**Model 1**			**Model 2**		
	Estimate (SE)	P-Value	Significance	Estimate (SE)	P-Value	Significance
Intercept	6.06 (1.86)	0.0012	**	5.48 (1.85)	0.0033	**
County FRPL	-8.55 (2.56)	0.001	**	-0.08 (0.03)	0.003	**
Brown	-1.90 (0.48)	<0.0001	***	-1.77 (0.48)	0.0002	***
Carter	-0.72 (0.37)	0.0499	*	-0.65 (0.37)	0.0777	.
James Madison	-0.62 (0.41)	0.1262		-0.55 (0.41)	0.178	
Johnson	-1.33 (0.37)	0.0004	***	-1.31 (0.37)	0.0005	***
Love	-2.69 (0.77)	0.0005	***	-2.46 (0.76)	0.0014	**
Montgomery	-1.13 (0.45)	0.0122	*	-0.98 (0.45)	0.0293	*
Norton	-0.11 (0.41)	0.7868		-0.06 (0.41)	0.8744	
Polk	-1.09 (0.36)	0.0026	**	-1.06 (0.36)	0.0034	**
Roosevelt	1.06 (0.47)	0.0262	*	0.84 (0.48)	0.0858	.
Valley View						
Latino	0.33 (0.19)	0.0825	.	-0.003 (0.27)	0.9898	
Black	-0.07 (0.12)	0.5422		-0.05 (0.12)	0.6589	
Other	0.12 (0.19)	0.5478		0.22 (0.21)	0.2745	
White						
Female	-0.009 (0.10)	0.9321				
EC	-0.39 (0.17)	0.02288	*	-0.37 (0.17)	0.0301	*
ESL				-0.53 (0.47)	0.2581	
Latino * ESL				1.23 (0.58)	0.0343	*
Adjusted R^2	0.23			0.24		

Table 7. Multiple regression models of change in Questioning as a function of race/ethnicity and other control variables.

GIB: Questioning	**Model 1**			**Model 2**		
	Estimate (SE)	p-value	Significance	Estimate (SE)	p-value	Significance
Intercept	7.59 (1.21)	<0.0001	***	6.64 (1.21)	<0.0001	***
County FRPL	-0.10 (0.02)	<0.0001	***	-0.08 (0.02)	<0.0001	***
Brown	-2.23 (0.32)	<0.0001	***	-2.04 (0.32)	<0.0001	***
Booker T. Washington	0.26 (0.20)	0.01973		0.16 (0.20)	0.4154	
Carter	-1.72 (0.27)	<0.0001	***	-1.59 (0.27)	<0.0001	***
Hadley	-4.27 (0.57)	<0.0001	***	-3.87 (0.57)	<0.0001	***
Hilton	-2.15 (0.39)	<0.0001	***	-1.92 (0.39)	<0.0001	***
James Madison	-1.64 (0.29)	<0.0001	***	-1.49 (0.28)	<0.0001	***
Johnson	-1.10 (0.19)	<0.0001	***	-1.09 (0.19)	<0.0001	***
Love	-3.73 (0.52)	<0.0001	***	-3.31 (0.51)	<0.0001	***
Montgomery	-1.97 (0.32)	<0.0001	***	-1.86 (0.32)	<0.0001	***
Norton	-0.99 (0.29)	0.0008	***	-0.88 (0.29)	0.0024	**
Ordway	-2.39 (0.39)	<0.0001	***	-2.17 (0.39)	<0.0001	***
Pierce	1.06 (0.31)	0.0006	***	0.79 (0.31)	0.0078	**
Polk	-1.35 (0.25)	<0.0001	***	-1.21 (0.25)	<0.0001	***
Roosevelt	1.28 (0.28)	<0.0001	***	0.98 (0.28)	0.0006	***
Samson	-0.28 (0.19)	0.1446		-0.53 (0.19)	0.0046	**
Stanton	0.95 (0.23)	<0.0001	***	0.91 (0.23)	<0.0001	***
Valley View						
Female	-0.07 (0.06)	0.247		-0.05 (0.06)	0.35	
Gender: Missing/Other	0.63 (0.24)	0.0074	**	0.58 (0.24)	0.0212	*
Male						
Kindergarten	-0.32 (0.09)	0.0074	**	-1.76 (0.45)	<0.0001	***
1st Grade	0.13 (0.08)	0.1041		1.15 (0.41)	0.0052	**
2nd Grade						
Latino	-0.17 (0.13)	0.1906		-0.20 (0.10)	0.033	*
Black	-0.30 (0.07)	<0.0001	***	-0.30 (0.067)	<0.0001	***
Other	-0.18 (0.11)	0.0896	.	-0.19 (0.10)	0.0723	.
White						
EC	-0.47 (0.09)	<0.0001	***	-0.46 (0.09)	<0.0001	***
ESL	-0.05 (0.13)	0.7281				
County FRPL * Kindergarten				0.02 (0.007)	0.0013	***
County FRPL * 1st Grade				-0.02 (0.006)	0.0108	*
County FRPL * 2nd Grade						
Adjusted R^2	0.21			0.24		

Table 8. Number of Bright IDEA ESL students by racial/ethnic group.

	Race/Ethnicity				
ESL	**Latino**	**Black**	**White**	**Other**	**Missing**
No	103 (47.0%)	685 (99.1%)	920 (99.5%)	144 (83.7%)	140 (100%)
Yes	115 (52.5%)	5 (0.7%)	4 (0.4%)	28 (19.4%)	0 (0%)
Missing/Other	1 (0.5%)	1 (0.1%)	1 (0.1%)	0 (0%)	0 (0%)

Figure 2. Changes in mean GIB score changes differ for Latino students based on ESL status.

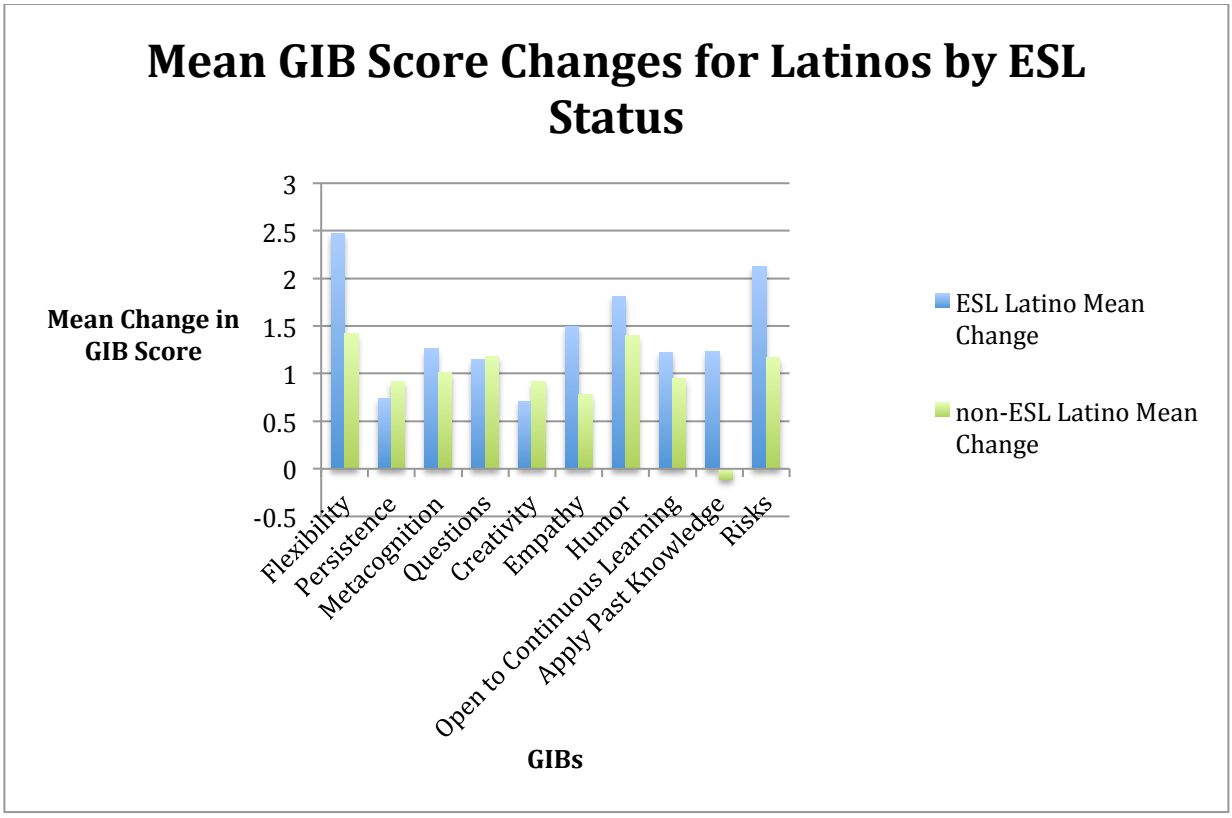

Table 9. ANOVA results for mean change in GIB score by race/ethnicity, separating Latinos into ESL and non-ESL categories and comparing them to the white, black, and other groups.

GIB	F-statistic	P-value	Significance
Metacognition	0.56	0.692	
Questioning	2.95	0.0193	*
Persistence	3.23	0.0131	*
Open to Continuous Learning	0.66	0.617	
Listening with Empathy and Understanding	1.38	0.24	
Creating	2.32	0.058	.
Flexibility	3.77	0.0051	**
Risks	2.17	0.073	.
Humor	0.64	0.636	
Applying Past Knowledge	2.56	0.39	*

Table 10. Regression models explain Flexibility as a function of ESL status. Model 1 presents this relationship by comparing Latino ESL students to all other racial and ethnic groups, including non-ESL Latinos. Model 2 tests for an interaction between Latino and ESL.

GIB: Flexibility	**Model 1: ESL Latino**			**Model 2: Latino * ESL**			
	Estimate (SE)	p-value	Significance		Estimate (SE)	p-value	Significance
Intercept	5.67 (1.86)	0.0025	**	Intercept	5.7 (1.86)	0.0036	**
County FRPL	-0.08 (0.03)	0.0016	**	County FRPL	-0.08 (0.03)	0.003	**
Black	0.004 (0.27)	0.9872		Black	-0.05 (0.12)	0.6589	
White	0.06 (0.26)	0.8136		Other	0.22 (0.21)	0.2745	
Other	0.21 (0.31)	0.5054		Latino	-0.003 (0.27)	0.9903	
Latino ESL	0.77 (0.35)	0.0278	*	White			
Latino non-ESL							
Brown	-1.77 (0.48)	0.0002	***	Brown	-1.76 (0.48)	0.0003	***
Carter	-0.65 (0.37)	0.082	.	Carter	-0.65 (0.37)	0.079	.
James Madison	-0.55 (0.41)	0.1782		James Madison	-0.55 (0.41)	0.1794	
Johnson	-1.27 (0.37)	0.0007	***	Johnson	-1.31 (0.37)	0.0005	***
Love	-2.51 (0.76)	0.0011	**	Love	-2.46 (0.77)	0.0015	**
Montgomery	-1.01 (0.45)	0.0259	*	Montgomery	-.98 (0.45)	0.03	*
Norton	-0.06 (0.41)	0.8827		Norton	-0.06 (0.41)	0.8758	
Polk	-1.05 (0.36)	0.0038	**	Polk	-1.06 (0.36)	0.0034	**
Roosevelt	0.99 (0.47)	0.0367	*	Roosevelt	0.84 (0.49)	0.0896	.
Valley View				Valley View			
Female	-0.001 (0.10)	0.9902		Female	0.003 (0.10)	0.9793	
EC	-0.37 (0.17)	0.0298	*	EC	-0.37 (0.17)	0.0318	*
				ESL	-0.53 (0.47)	0.258	
				Latino * ESL	1.23 (0.58)	0.035	*
Adjusted R^2	0.24				0.24		

Table 11. Regression models that explain mean change in Applying Past Knowledge GIB as a function of being ESL and Latino. Model 1 presents this relationship by comparing Latino ESL students to all other racial and ethnic groups, including non-ESL Latinos. Model 2 tests for an interaction between Latino and ESL.

GIB: Applying Past Knowledge	**Model 1: ESL Latino**			**Model 2: Latino * ESL**			
	Estimate (SE)	p-value	Significance		Estimate (SE)	p-value	Significance
Intercept	18.19 (6.01)	0.0027	**	Intercept	19.30 (5.98)	0.0014	**
County FRPL	-0.25 (0.08)	0.0018	**	County FRPL	-0.25 (0.08)	0.0018	**
Black	0.94 (0.39)	0.0177	*	Latino	-0.17 (0.15)	0.2412	
White	1.11 (0.39)	0.0047	**	Black	0.02 (0.26)	0.9307	
Other	1.14 (0.45)	0.0112	*	Other	-1.11 (0.39)	0.0048	**
Latino ESL	1.47 (0.44)	0.001	***	White			
Latino non-ESL				Harris	-9.52 (2.78)	0.0007	***
Harris	-9.51 (2.77)	0.0007	***	Hilton	-7.61 (1.83)	<0.0001	***
Hilton	-7.61 (1.83)	<0.0001	***	James Madison	-4.72 (1.35)	0.0005	***
James Madison	-4.72 (1.35)	0.0005	***	Norton	-3.86 (1.34)	0.004	**
Norton	-3.86 (1.34)	0.0043	**	Ordway	-6.30 (1.82)	0.0006	***
Ordway	-6.30 (1.82)	0.0006	***	Pierce	2.66 (1.12)	0.0179	*
Pierce	2.66 (1.11)	0.0178	*	Roosevelt	4.16 (1.98)	0.0003	***
Roosevelt	4.16 (1.12)	0.0003	***	Rowan	-9.21 (1.98)	<0.0001	***
Stanton							
EC	-0.24 (0.25)	0.3395		EC	-0.24 (0.25)	0.3397	
Female	0.24 (0.13)	0.0582	.	Female	0.25 (0.13)	0.058	.
				ESL	0.07 (0.53)	0.8913	
				Latino * ESL	1.39 (0.70)	0.0458	*
Adjusted R^2	0.32				0.32		

Table 12. Regression models explain mean change in Questioning score as a function of ESL status. Model 1 presents this relationship by comparing Latino ESL students to all other racial and ethnic groups, including non-ESL Latinos. Model 2 tests for an interaction between Latino and ESL.

GIB: Questioning	**Model 1: ESL Latino**			**Model 2: ESL * Latino**			
	Estimate (SE)	p-value	Significance		Estimate (SE)	p-value	Significance
Intercept	7.42 (1.21)	<0.0001	***	Intercept	7.58 (1.21)	<0.0001	***
County FRPL	-0.10 (0.02)	<0.0001	***	County FRPL	-0.10 (0.02)	<0.0001	***
Black	-0.11 (0.15)	0.4522		Black	-0.30 (0.07)	<0.0001	***
White	0.19 (0.15)	0.2066		Other	-0.18 (0.11)	0.1063	
Other	-0.005 (0.17)	0.9758		Latino	-0.18 (0.14)	0.2337	
Latino ESL	-0.02 (0.18)	0.9079		White			
Latino non-ESL							
Brown	-2.23 (0.32)	<0.0001	***	Brown	-2.23 (0.32)	<0.0001	***
Booker T. Washington	0.26 (0.20)	0.185		Booker T. Washington	0.26 (0.20)	0.2016	
Carter	-1.72 (0.27)	<0.0001	***	Carter	-1.72 (0.27)	<0.0001	***
Harris	-4.28 (0.57)	<0.0001	***	Harris	-4.26 (0.57)	<0.0001	***
Hilton	-2.13 (0.39)	<0.0001	***	Hilton	-2.13 (0.39)	<0.0001	***
James Madison	-1.64 (0.29)	<0.0001	***	James Madison	-1.64 (0.29)	<0.0001	***
Johnson	-1.10 (0.19)	<0.0001	***	Johnson	-1.10 (0.19)	<0.0001	***
Love	-3.73 (0.51)	<0.0001	***	Love	-3.73 (0.52)	<0.0001	***
Montgomery	-1.98 (0.32)	<0.0001	***	Montgomery	-1.97 (0.32)	<0.0001	***
Norton	-0.99 (0.30)	0.0008	***	Norton	-0.99 (0.30)	0.0009	***
Ordway	-2.40 (0.39)	<0.0001	***	Ordway	-2.40 (0.40)	<0.0001	***
Pierce	1.07 (0.31)	0.0008	***	Pierce	1.05 (0.31)	0.001	**
Polk	-1.35 (0.25)	<0.0001	***	Polk	-1.34 (0.25)	<0.0001	***
Roosevelt	1.30 (0.27)	<0.0001	***	Roosevelt	1.28 (0.28)	<0.0001	***
Rowan	-2.69 (0.75)	<0.0001	***	Rowan	-2.69 (0.76)	0.004	***
Samson	-0.28 (0.19)	<0.0001	***	Samson	-0.27 (0.19)	0.16	
Stanton	0.95 (0.23)	<0.0001	***	Stanton	0.95 (0.24)	<0.0001	***
Valley View				Valley View			
Female	-0.07 (0.06)	0.2496		Female	-0.07 (0.06)	0.2486	
Gender Missing/Other	0.64 (0.24)	0.0075		Gender Missing/Other	0.64 (0.24)	0.0073	
EC	-0.47 (0.09)	<0.0001	***	EC	-0.47 (0.09)	<0.0001	***
Kindergarten	-0.32 (0.09)	0.0003	***	Kindergarten	-0.32 (0.09)	0.0003	***
First Grade	0.12 (0.08)	0.1074		First Grade	0.13 (0.08)	0.1042	
Second Grade				Second Grade			
				ESL	-0.07 (0.20)	0.7363	
				Latino * ESL	0.04 (0.27)	0.8889	
Adjusted R^2	0.21				0.21		

Table 13. Regression models for Persistence as a function of ESL status. Model 1 presents this relationship by comparing Latino ESL students to all other racial and ethnic groups, including non-ESL Latinos. Model 2 tests for an interaction between Latino and ESL.

GIB: Persistence	**Model 1: ESL Latino**				**Model 2: ESL * Latino**		
	Estimate (SE)	p-value	Significance		Estimate (SE)	p-value	Significance
Intercept	-3.74 (1.54)	0.0167	*	Intercept	-3.60 (1.51)	0.179	*
County FRPL	0.07 (0.02)	0.0022	**	County FRPL	0.07 (0.02)	0.0023	**
Black	-0.21 (0.25)	0.4114		Black	-0.35 (0.12)	0.0051	**
White	0.14 (0.25)	0.5714		Other	-0.18 (0.20)	0.3596	
Other	-0.03 (0.28)	0.9122		Latino	-0.14 (0.25)	0.5732	
Latino ESL	-0.41 (0.29)	0.1633		White			
Latino non-ESL							
Carter	-1.44 (0.23)	<0.0001	***	Carter	-1.43 (0.23)	<0.0001	***
James Madison	-0.45 (0.25)	0.0804	.	James Madison	-0.44 (0.25)	0.0814	.
Johnson	-0.97 (0.22)	<0.0001	***	Johnson	-0.97 (0.22)	<0.0001	***
Love	-0.90 (0.50)	0.0738	.	Love	-0.90 (0.50)	0.0743	.
Montgomery	-0.79 (0.27)	0.0034	**	Montgomery	-0.80 (0.27)	0.0034	**
Polk	0.44 (0.20)	0.0275	*	Polk	0.44 (0.20)	0.028	*
Roosevelt	-2.84 (0.64)	<0.0001	***	Roosevelt	-2.83 (0.65)	<0.0001	***
Samson	-2.12 (0.44)	<0.0001	***	Samson	-2.12 (0.45)	<0.0001	***
Valley View				Valley View			
Female	0.02 (0.10)	0.8649		Female	0.02 (0.10)	0.8693	
EC	-0.42 (0.17)	0.0116	*	EC	-0.43 (0.17)	0.0118	*
				ESL	0.04 (0.30)	0.8908	
				Latino * ESL	-0.45 (0.41)	0.2737	
Adjusted R^2	0.50				0.50		

Table 14. To check assumptions regarding GIB measurement, Questioning is changed into a dichotomous indicato representing whether or not a student improved from any one GIB level to another after a year in Bright IDEA. Results from a multivariate logistic regression model for this dichotomous indicator are compared to the original linear regression results of Questioning as a continuous variable.

GIB: Questioning	**Original Model**			**Questioning as Dichotomous Variable**			
	Estimate (SE)	p-value	Significance	Estimate (SE)	Odds Ratio	p-value	Significance
Intercept	7.59 (1.21)	<0.0001	***	-11.37 (3.60)	0.00001	0.0016	**
County FRPL	-0.10 (0.02)	<0.0001	***	0.14 (0.05)	1.150	0.0025	**
Brown	-2.23 (0.32)	<0.0001	***	4.05 (1.00)	57.397	<0.0001	***
Booker T. Washington	0.26 (0.20)	0.01973		0.25 (0.44)	1.284	0.5685	
Carter	-1.72 (0.27)	<0.0001	***	2.55 (0.85)	12.807	0.0028	**
Hadley	-4.27 (0.57)	<0.0001	***	4.36 (1.75)	78.257	0.0125	*
Hilton	-2.15 (0.39)	<0.0001	***	2.84 (1.20)	17.116	0.0179	*
James Madison	-1.64 (0.29)	<0.0001	***	3.64 (0.91)	38.092	<0.0001	***
Johnson	-1.10 (0.19)	<0.0001	***	1.10 (0.60)	3.004	0.0675	.
Love	-3.73 (0.52)	<0.0001	***	4.93 (1.59)	138.380	0.002	**
Montgomery	-1.97 (0.32)	<0.0001	***	3.98 (1.00)	53.517	<0.0001	***
Norton	-0.99 (0.29)	0.0008	***	2.26 (0.92)	9.583	0.0142	*
Ordway	-2.39 (0.39)	<0.0001	***	3.81 (1.20)	45.150	0.0015	**
Pierce	1.06 (0.31)	0.0006	***	-1.12 (0.73)	0.326	0.1242	
Polk	-1.35 (0.25)	<0.0001	***	2.91 (0.81)	18.357	0.0003	***
Roosevelt	1.28 (0.28)	<0.0001	***	-1.45 (0.67)	0.235	0.0307	*
Samson	-0.28 (0.19)	0.1446		0.41 (0.42)	1.507	0.3324	
Stanton	0.95 (0.23)	<0.0001	***	-1.98 (1.07)	0.138	0.0653	.
Valley View							
Female	-0.07 (0.06)	0.247		0.04 (0.13)	1.041	0.7501	
Gender: Missing/Other	0.64 (0.24)	0.0074	**	0.48 (0.53)	1.616	0.3636	
Male							
Kindergarten	-0.32 (0.09)	0.0074	**	-1.14 (0.21)	0.320	<0.0001	***
1st Grade	0.13 (0.08)	0.1041		-0.76 (0.17)	0.468	<0.0001	***
2nd Grade							
Latino	-0.17 (0.13)	0.1906		0.07 (0.23)	1.073	0.729	
Black	-0.30 (0.07)	<0.0001	***	0.19 (0.16)	1.209	0.2428	
Other	-0.18 (0.11)	0.0896	.	0.04 (0.25)	1.041	0.8787	
White							
EC	-0.47 (0.09)	<0.0001	***	0.09 (0.21)	1.094	0.6828	
ESL	-0.05 (0.13)	0.7281					

Table 14. A multivariate logistic regression model shows the relationship between GIB improvement and predictor variables when Applying Past Knowledge is a dichotomous indicator representing whether or not a student improved from any one GIB level to another. Logistic regression results are compared to original linear regression results for Applying Past Knowledge.

GIB: Applying Past Knowledge	**Original Model**			**Applying Past Knowledge as Dichotomous Variable**				
	Estimate (SE)	p-value	Significance		Estimate (SE)	Odds Ratio	p-value	Significance
Intercept	18.19 (6.01)	0.0027	**	Intercept	-44.18 (13.91)	0.000	0.0015	**
County				County				
FRPL	-0.25 (0.08)	0.0018	**	FRPL	0.58 (0.18)	1.786	0.0017	***
Black	0.94 (0.39)	0.0177	*	Black	0.56 (0.98)	1.751	0.5677	
White	1.11 (0.39)	0.0047	**	White	0.83 (0.97)	2.293	0.3939	
Other	1.14 (0.45)	0.0112	*	Other	0.33 (1.08)	1.391	0.7614	
Latino ESL	1.47 (0.44)	0.001	***	Latino ESL	-0.77 (1.10)	0.463	0.4852	
Latino non-ESL				Latino non-ESL				
Harris	-9.51 (2.77)	0.0007	***	Harris	17.97 (6.46)	63719423.78	0.0054	**
Hilton	-7.54 (1.82)	<0.0001	***	Hilton	11.89 (4.26)	145801.298	0.0052	**
James				James				
Madison	-4.72 (1.35)	0.0005	***	Madison	10.97 (3.17)	58104.593	0.0005	***
Norton	-3.86 (1.34)	0.0043	**	Norton	8.78 (3.16)	6502.877	0.0055	**
Ordway	-6.30 (1.82)	0.0006	***	Ordway	13.66 (4.25)	855978.039	0.0013	**
Pierce	2.66 (1.11)	0.0178	*	Pierce	-7.02 (2.45)	0.001	0.0042	**
Roosevelt	4.16 (1.12)	0.0003	***	Roosevelt	-9.76 (2.54)	0.000	0.0001	***
Stanton				Stanton				
EC	-0.24 (0.25)	0.3395		EC	1.00 (0.57)	2.718	0.0796	.
Female	0.24 (0.13)	0.0582	.	Female	-0.002 (0.28)	0.998	0.9941	

Codebook

Variable Name	Category	Standard Code	Other Code Used
Race/Ethnicity	White	W	white White w C
Race/Ethnicity	Black	B	black Black B AA
Race/Ethnicity	Hispanic	H	hispanic h Hispanic Hispan Hispa Hisp
Race/Ethnicity	Asian	A	asian Asian/Pacific Islander a
Race/Ethnicity	American Indian	AI	American Indian/Alaska Native
Race/Ethnicity	Mixed	M	multi-racial Bi-rac Biracial
Race/Ethnicity	Other	O	I
Gender	Male	M	
Gender	Female	F	
ESL	Yes	Y	X * ESL LEP FEP ccr
ESL	No	N	blank no
EC	Yes	Y	AG X DD OHI AIG Speech EC

			SLD AU,SI AU,SLI SLI LD SI Sp/EMD BED SLI/EMD SLD-OHI AU MD dd/ot/sp Spch * SP EC/SP EMD SL Referred SPED SP CCR C/Sp
EC	No	N	No blank
EC	Other	O	other Barton Exited
GIB	Readiness	R	Re RA RB RC RD RE RE/D Discovery Exp re/e Readiness/Discovery D RR
GIB	Emergent	EE	EE/E Ee

			E ER Emerg. EEE Emergent EP
GIB	Progressing	P	
GIB	Early Independent	EI	IE
GIB	Independent	I	